SEQUENCE LISTING

<110> Mello, Craig C.
      Tabara, Hiroaki
      Grishok, Alla
      Fire, Andrew

<120> RNA INTERFERENCE PATHWAY GENES AS TOOLS FOR TARGETED GENETIC
      INTERFERENCE

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<141> 2000-10-13

<150> US 60/193,218
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Phe Tyr Arg His Ser Leu Asp Pro Glu Met Lys Trp Leu Ala Arg Pro
                15                  20                  25


act ggt aaa tgc gac ggc aaa ttc tat gag aag aaa gta ctt ctt ttg     149
Thr Gly Lys Cys Asp Gly Lys Phe Tyr Glu Lys Lys Val Leu Leu Leu
            30                  35                  40


gta aat tgg ttc aag ttc tcc agc aaa att tac gat cgg gaa tac tac     197
Val Asn Trp Phe Lys Phe Ser Ser Lys Ile Tyr Asp Arg Glu Tyr Tyr
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2

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gag tat gaa gtg aaa atg aca aag gaa gta ttg aat aga aaa cca gga    245
Glu Tyr Glu Val Lys Met Thr Lys Glu Val Leu Asn Arg Lys Pro Gly
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aaa cct ttc cca aaa aag aca gaa att cca att ccc gat cgt gca aaa    293
Lys Pro Phe Pro Lys Lys Thr Glu Ile Pro Ile Pro Asp Arg Ala Lys
                 80                  85                  90

ctc ttc tgg caa cat ctt cgg cat gag aag aag cag aca gat ttt att    341
Leu Phe Trp Gln His Leu Arg His Glu Lys Lys Gln Thr Asp Phe Ile
             95                 100                 105

ctc gaa gac tat gtt ttt gat gaa aag gac act gtt tat agt gtt tgt    389
Leu Glu Asp Tyr Val Phe Asp Glu Lys Asp Thr Val Tyr Ser Val Cys
         110                 115                 120

cga ctg aac act gtc aca tca aaa atg ctg gtt tcg gag aaa gta gta    437
Arg Leu Asn Thr Val Thr Ser Lys Met Leu Val Ser Glu Lys Val Val
     125                 130                 135

aaa aag gat tcg gag aaa aaa gat gaa aag gat ttg gag aaa aaa atc    485
Lys Lys Asp Ser Glu Lys Lys Asp Glu Lys Asp Leu Glu Lys Lys Ile
140                 145                 150                 155

tta tac aca atg ata ctt acc tat cgt aaa aaa ttt cac ctg aac ttt    533
Leu Tyr Thr Met Ile Leu Thr Tyr Arg Lys Lys Phe His Leu Asn Phe
                 160                 165                 170

agt cga gaa aat ccg gaa aaa gac gaa gaa gcg aat cgg agt tac aaa    581
Ser Arg Glu Asn Pro Glu Lys Asp Glu Glu Ala Asn Arg Ser Tyr Lys
             175                 180                 185

ttc ctg aag aat gtt atg acc cag aaa gtt cgc tac gcg cct ttt gtg    629
Phe Leu Lys Asn Val Met Thr Gln Lys Val Arg Tyr Ala Pro Phe Val
             190                 195                 200

aac gag gag att aaa gta caa ttc gcg aaa aat ttt gtg tac gat aat    677
Asn Glu Glu Ile Lys Val Gln Phe Ala Lys Asn Phe Val Tyr Asp Asn
     205                 210                 215

aat tca att ctg cga gtt cct gaa tcg ttt cac gat cca aac aga ttc    725
Asn Ser Ile Leu Arg Val Pro Glu Ser Phe His Asp Pro Asn Arg Phe
220                 225                 230                 235

gaa caa tca tta gaa gta gca cca aga atc gaa gca tgg ttt gga att    773
Glu Gln Ser Leu Glu Val Ala Pro Arg Ile Glu Ala Trp Phe Gly Ile
                 240                 245                 250

tac att gga atc aaa gaa ttg ttc gat ggt gaa cct gtg ctc aat ttt    821
Tyr Ile Gly Ile Lys Glu Leu Phe Asp Gly Glu Pro Val Leu Asn Phe
             255                 260                 265

gca att gtc gat aaa cta ttc tac aat gca ccg aaa atg tct ctt ctg    869
Ala Ile Val Asp Lys Leu Phe Tyr Asn Ala Pro Lys Met Ser Leu Leu
         270                 275                 280

gat tat ctt ctc cta att gtc gac ccc cag tcg tgt aac gat gat gta    917
Asp Tyr Leu Leu Leu Ile Val Asp Pro Gln Ser Cys Asn Asp Asp Val
     285                 290                 295
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3

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cga aaa gat ctt aaa aca aaa ctg atg gcg gga aaa atg aca atc aga          965
Arg Lys Asp Leu Lys Thr Lys Leu Met Ala Gly Lys Met Thr Ile Arg
300             305             310             315

caa gcc gcg cgg cca aga att cga caa tta ttg gaa aat ttg aag ctg         1013
Gln Ala Ala Arg Pro Arg Ile Arg Gln Leu Leu Glu Asn Leu Lys Leu
            320             325             330

aaa tgc gca gaa gtt tgg gat aac gaa atg tcg aga ttg aca gaa cga         1061
Lys Cys Ala Glu Val Trp Asp Asn Glu Met Ser Arg Leu Thr Glu Arg
            335             340             345

cat ctg aca ttt cta gat ttg tgc gag gaa aac tct ctt gtt tat aaa         1109
His Leu Thr Phe Leu Asp Leu Cys Glu Glu Asn Ser Leu Val Tyr Lys
            350             355             360

gtc act ggt aaa tcg gac aga gga aga aat gca aaa aag tac gat act         1157
Val Thr Gly Lys Ser Asp Arg Gly Arg Asn Ala Lys Lys Tyr Asp Thr
            365             370             375

aca ttg ttc aaa atc tat gag gaa aac aaa aag ttc att gag ttt ccc         1205
Thr Leu Phe Lys Ile Tyr Glu Glu Asn Lys Lys Phe Ile Glu Phe Pro
380             385             390             395

cac cta cca cta gtc aaa gtt aaa agt gga gca aaa gaa tac gct gta         1253
His Leu Pro Leu Val Lys Val Lys Ser Gly Ala Lys Glu Tyr Ala Val
            400             405             410

cca atg gaa cat ctt gaa gtt cat gag aag cca caa aga tac aag aat         1301
Pro Met Glu His Leu Glu Val His Glu Lys Pro Gln Arg Tyr Lys Asn
            415             420             425

cga att gat ctg gtg atg caa gac aag ttt cta aag cga gct aca cga         1349
Arg Ile Asp Leu Val Met Gln Asp Lys Phe Leu Lys Arg Ala Thr Arg
            430             435             440

aaa cct cac gac tac aaa gaa aat acc cta aaa atg ctg aaa gaa ttg         1397
Lys Pro His Asp Tyr Lys Glu Asn Thr Leu Lys Met Leu Lys Glu Leu
            445             450             455

gat ttc tct tct gaa gag cta aat ttt gtt gaa aga ttt gga tta tgc         1445
Asp Phe Ser Ser Glu Glu Leu Asn Phe Val Glu Arg Phe Gly Leu Cys
460             465             470             475

tcc aaa ctt cag atg atc gaa tgt cca gga aag gtt ttg aaa gag cca         1493
Ser Lys Leu Gln Met Ile Glu Cys Pro Gly Lys Val Leu Lys Glu Pro
            480             485             490

atg ctt gtg aat agt gta aat gaa caa att aaa atg aca cca gtg att         1541
Met Leu Val Asn Ser Val Asn Glu Gln Ile Lys Met Thr Pro Val Ile
            495             500             505

cgt gga ttt caa gaa aaa caa ttg aat gtg gtt ccc gaa aaa gaa ctt         1589
Arg Gly Phe Gln Glu Lys Gln Leu Asn Val Val Pro Glu Lys Glu Leu
            510             515             520

tgc tgt gct gtt ttt gta gtc aac gaa aca gcg gga aat cca tgc tta         1637
Cys Cys Ala Val Phe Val Val Asn Glu Thr Ala Gly Asn Pro Cys Leu
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gaa gag aac gac gtt gtt aag ttc tac acc gaa cta att ggt ggt tgc    1685
Glu Glu Asn Asp Val Val Lys Phe Tyr Thr Glu Leu Ile Gly Gly Cys
540             545             550                         555

aag ttc cgt gga ata cga att ggt gcc aat gaa aac aga gga gcg caa    1733
Lys Phe Arg Gly Ile Arg Ile Gly Ala Asn Glu Asn Arg Gly Ala Gln
                560             565             570

tct att atg tac gac gcg acg aaa aat gaa tat gcc ttc tac aaa aat    1781
Ser Ile Met Tyr Asp Ala Thr Lys Asn Glu Tyr Ala Phe Tyr Lys Asn
            575             580             585

tgt aca cta aat acc gga atc ggt aga ttt gaa ata gcc gca aca gaa    1829
Cys Thr Leu Asn Thr Gly Ile Gly Arg Phe Glu Ile Ala Ala Thr Glu
            590             595             600

gcg aag aat atg ttt gaa cgt ctt ccc gat aaa gaa caa aaa gtc tta    1877
Ala Lys Asn Met Phe Glu Arg Leu Pro Asp Lys Glu Gln Lys Val Leu
        605             610             615

atg ttc att atc att tcc aaa cga caa ctg aat gct tac ggt ttt gtg    1925
Met Phe Ile Ile Ile Ser Lys Arg Gln Leu Asn Ala Tyr Gly Phe Val
620             625             630                         635

aaa cat tat tgc gat cac acc atc ggt gta gct aat cag cat att act    1973
Lys His Tyr Cys Asp His Thr Ile Gly Val Ala Asn Gln His Ile Thr
                640             645             650

tct gaa aca gtc aca aaa gct ttg gca tca cta agg cac gag aaa gga    2021
Ser Glu Thr Val Thr Lys Ala Leu Ala Ser Leu Arg His Glu Lys Gly
            655             660             665

tca aaa cga att ttc tat caa att gca ttg aaa atc aac gcg aaa tta    2069
Ser Lys Arg Ile Phe Tyr Gln Ile Ala Leu Lys Ile Asn Ala Lys Leu
            670             675             680

gga ggt att aac cag gag ctt gac tgg tca gaa att gca gaa ata tca    2117
Gly Gly Ile Asn Gln Glu Leu Asp Trp Ser Glu Ile Ala Glu Ile Ser
        685             690             695

cca gaa gaa aaa gaa aga cgg aaa aca atg cca tta act atg tat gtt    2165
Pro Glu Glu Lys Glu Arg Arg Lys Thr Met Pro Leu Thr Met Tyr Val
700             705             710                         715

gga att gat gta act cat cca acc tcc tac agt gga att gat tat tct    2213
Gly Ile Asp Val Thr His Pro Thr Ser Tyr Ser Gly Ile Asp Tyr Ser
            720             725             730

ata gcg gct gta gta gcg agt atc aat cca ggt gga act atc tat cga    2261
Ile Ala Ala Val Val Ala Ser Ile Asn Pro Gly Gly Thr Ile Tyr Arg
            735             740             745

aat atg att gtg act caa gaa gaa tgt cgt ccc ggt gag cgt gca gtg    2309
Asn Met Ile Val Thr Gln Glu Glu Cys Arg Pro Gly Glu Arg Ala Val
            750             755             760

gct cat gga cgg gaa aga aca gat att ttg gaa gca aag ttc gtg aaa    2357
Ala His Gly Arg Glu Arg Thr Asp Ile Leu Glu Ala Lys Phe Val Lys
        765             770             775
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5

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780             785             790             795

att gta gtc tat cga gac gga gtt agc gat tcg gag atg cta cgt gtt        2453
Ile Val Val Tyr Arg Asp Gly Val Ser Asp Ser Glu Met Leu Arg Val
            800             805             810

agt cat gat gag ctt cga tct tta aaa agc gaa gta aaa caa ttc atg        2501
Ser His Asp Glu Leu Arg Ser Leu Lys Ser Glu Val Lys Gln Phe Met
            815             820             825

tcg gaa cgg gat gga gaa gat cca gag ccg aag tac acg ttc att gtg        2549
Ser Glu Arg Asp Gly Glu Asp Pro Glu Pro Lys Tyr Thr Phe Ile Val
            830             835             840

att cag aaa aga cac aat aca cga ttg ctt cga aga atg gaa aaa gat        2597
Ile Gln Lys Arg His Asn Thr Arg Leu Leu Arg Arg Met Glu Lys Asp
            845             850             855

aag cca gtg gtc aat aaa gat ctt act cct gct gaa aca gat gtc gct        2645
Lys Pro Val Val Asn Lys Asp Leu Thr Pro Ala Glu Thr Asp Val Ala
860             865             870             875

gtt gct gct gtt aaa caa tgg gag gag gat atg aaa gaa agc aaa gaa        2693
Val Ala Ala Val Lys Gln Trp Glu Glu Asp Met Lys Glu Ser Lys Glu
            880             885             890

act gga att gtg aac cca tca tcc gga aca act gtg gat aaa ctt atc        2741
Thr Gly Ile Val Asn Pro Ser Ser Gly Thr Thr Val Asp Lys Leu Ile
            895             900             905

gtt tcg aaa tac aaa ttc gat ttt ttc ttg gca tct cat cat ggt gtc        2789
Val Ser Lys Tyr Lys Phe Asp Phe Phe Leu Ala Ser His His Gly Val
            910             915             920

ctt ggt aca tct cgt cca gga cat tac act gtt atg tat gac gat aaa        2837
Leu Gly Thr Ser Arg Pro Gly His Tyr Thr Val Met Tyr Asp Asp Lys
            925             930             935

gga atg agc caa gat gaa gtc tat aaa atg acc tac gga ctt gct ttt        2885
Gly Met Ser Gln Asp Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala Phe
940             945             950             955

ctc tct gct aga tgt cga aaa ccc atc tcg ttg cct gtt ccg gtt cat        2933
Leu Ser Ala Arg Cys Arg Lys Pro Ile Ser Leu Pro Val Pro Val His
            960             965             970

tat gct cat tta tca tgt gaa aaa gcg aaa gag ctt tat cga act tac        2981
Tyr Ala His Leu Ser Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr Tyr
            975             980             985

aag gaa cat tac atc ggt gac tat gca cag cca cgg act cga cac gaa        3029
Lys Glu His Tyr Ile Gly Asp Tyr Ala Gln Pro Arg Thr Arg His Glu
            990             995             1000

atg gaa cat ttt ctc caa act aac gtg aag tac cct gga atg tcg ttc        3077
Met Glu His Phe Leu Gln Thr Asn Val Lys Tyr Pro Gly Met Ser Phe
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6

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1020


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         35                  40                  45
Phe Ser Ser Lys Ile Tyr Asp Arg Glu Tyr Tyr Glu Tyr Glu Val Lys
     50                  55                  60
Met Thr Lys Glu Val Leu Asn Arg Lys Pro Gly Lys Pro Phe Pro Lys
 65                  70                  75                  80
Lys Thr Glu Ile Pro Ile Pro Asp Arg Ala Lys Leu Phe Trp Gln His
                 85                  90                  95
Leu Arg His Glu Lys Lys Gln Thr Asp Phe Ile Leu Glu Asp Tyr Val
            100                 105                 110
Phe Asp Glu Lys Asp Thr Val Tyr Ser Val Cys Arg Leu Asn Thr Val
            115                 120                 125
Thr Ser Lys Met Leu Val Ser Glu Lys Val Val Lys Lys Asp Ser Glu
        130                 135                 140
Lys Lys Asp Glu Lys Asp Leu Glu Lys Lys Ile Leu Tyr Thr Met Ile
145                 150                 155                 160
Leu Thr Tyr Arg Lys Lys Phe His Leu Asn Phe Ser Arg Glu Asn Pro
                165                 170                 175
Glu Lys Asp Glu Glu Ala Asn Arg Ser Tyr Lys Phe Leu Lys Asn Val
            180                 185                 190
Met Thr Gln Lys Val Arg Tyr Ala Pro Phe Val Asn Glu Glu Ile Lys
        195                 200                 205
Val Gln Phe Ala Lys Asn Phe Val Tyr Asp Asn Asn Ser Ile Leu Arg
    210                 215                 220
Val Pro Glu Ser Phe His Asp Pro Asn Arg Phe Glu Gln Ser Leu Glu
225                 230                 235                 240
Val Ala Pro Arg Ile Glu Ala Trp Phe Gly Ile Tyr Ile Gly Ile Lys
                245                 250                 255
Glu Leu Phe Asp Gly Glu Pro Val Leu Asn Phe Ala Ile Val Asp Lys
            260                 265                 270
Leu Phe Tyr Asn Ala Pro Lys Met Ser Leu Leu Asp Tyr Leu Leu Leu
        275                 280                 285
Ile Val Asp Pro Gln Ser Cys Asn Asp Asp Val Arg Lys Asp Leu Lys
    290                 295                 300
Thr Lys Leu Met Ala Gly Lys Met Thr Ile Arg Gln Ala Ala Arg Pro
305                 310                 315                 320
Arg Ile Arg Gln Leu Leu Glu Asn Leu Lys Leu Lys Cys Ala Glu Val
                325                 330                 335
Trp Asp Asn Glu Met Ser Arg Leu Thr Glu Arg His Leu Thr Phe Leu
            340                 345                 350
Asp Leu Cys Glu Glu Asn Ser Leu Val Tyr Lys Val Thr Gly Lys Ser
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7

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Asp Arg Gly Arg Asn Ala Lys Lys Tyr Asp Thr Thr Leu Phe Lys Ile
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Tyr Glu Glu Asn Lys Lys Phe Ile Glu Phe Pro His Leu Pro Leu Val
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Lys Val Lys Ser Gly Ala Lys Glu Tyr Ala Val Pro Met Glu His Leu
        405             410             415
Glu Val His Glu Lys Pro Gln Arg Tyr Lys Asn Arg Ile Asp Leu Val
        420             425             430
Met Gln Asp Lys Phe Leu Lys Arg Ala Thr Arg Lys Pro His Asp Tyr
        435             440             445
Lys Glu Asn Thr Leu Lys Met Leu Lys Glu Leu Asp Phe Ser Ser Glu
    450             455             460
Glu Leu Asn Phe Val Glu Arg Phe Gly Leu Cys Ser Lys Leu Gln Met
465             470             475             480
Ile Glu Cys Pro Gly Lys Val Leu Lys Glu Pro Met Leu Val Asn Ser
        485             490             495
Val Asn Glu Gln Ile Lys Met Thr Pro Val Ile Arg Gly Phe Gln Glu
        500             505             510
Lys Gln Leu Asn Val Val Pro Glu Lys Glu Leu Cys Cys Ala Val Phe
        515             520             525
Val Val Asn Glu Thr Ala Gly Asn Pro Cys Leu Glu Glu Asn Asp Val
    530             535             540
Val Lys Phe Tyr Thr Glu Leu Ile Gly Gly Cys Lys Phe Arg Gly Ile
545             550             555             560
Arg Ile Gly Ala Asn Glu Asn Arg Gly Ala Gln Ser Ile Met Tyr Asp
            565             570             575
Ala Thr Lys Asn Glu Tyr Ala Phe Tyr Lys Asn Cys Thr Leu Asn Thr
            580             585             590
Gly Ile Gly Arg Phe Glu Ile Ala Ala Thr Glu Ala Lys Asn Met Phe
        595             600             605
Glu Arg Leu Pro Asp Lys Glu Gln Lys Val Leu Met Phe Ile Ile Ile
    610             615             620
Ser Lys Arg Gln Leu Asn Ala Tyr Gly Phe Val Lys His Tyr Cys Asp
625             630             635             640
His Thr Ile Gly Val Ala Asn Gln His Ile Thr Ser Glu Thr Val Thr
            645             650             655
Lys Ala Leu Ala Ser Leu Arg His Glu Lys Gly Ser Lys Arg Ile Phe
            660             665             670
Tyr Gln Ile Ala Leu Lys Ile Asn Ala Lys Leu Gly Gly Ile Asn Gln
        675             680             685
Glu Leu Asp Trp Ser Glu Ile Ala Glu Ile Ser Pro Glu Glu Lys Glu
    690             695             700
Arg Arg Lys Thr Met Pro Leu Thr Met Tyr Val Gly Ile Asp Val Thr
705             710             715             720
His Pro Thr Ser Tyr Ser Gly Ile Asp Tyr Ser Ile Ala Ala Val Val
            725             730             735
Ala Ser Ile Asn Pro Gly Gly Thr Ile Tyr Arg Asn Met Ile Val Thr
            740             745             750
Gln Glu Glu Cys Arg Pro Gly Glu Arg Ala Val Ala His Gly Arg Glu
        755             760             765
Arg Thr Asp Ile Leu Glu Ala Lys Phe Val Lys Leu Leu Arg Glu Phe
    770             775             780
Ala Glu Asn Asn Asp Asn Arg Ala Pro Ala His Ile Val Val Tyr Arg
785             790             795             800
Asp Gly Val Ser Asp Ser Glu Met Leu Arg Val Ser His Asp Glu Leu
            805             810             815
Arg Ser Leu Lys Ser Glu Val Lys Gln Phe Met Ser Glu Arg Asp Gly
            820             825             830
Glu Asp Pro Glu Pro Lys Tyr Thr Phe Ile Val Ile Gln Lys Arg His
        835             840             845
```

8

```
Asn Thr Arg Leu Leu Arg Arg Met Glu Lys Asp Lys Pro Val Val Asn
    850                 855                 860
Lys Asp Leu Thr Pro Ala Glu Thr Asp Val Ala Val Ala Ala Val Lys
865                 870                 875                 880
Gln Trp Glu Glu Asp Met Lys Glu Ser Lys Glu Thr Gly Ile Val Asn
                885                 890                 895
Pro Ser Ser Gly Thr Thr Val Asp Lys Leu Ile Val Ser Lys Tyr Lys
                900                 905                 910
Phe Asp Phe Phe Leu Ala Ser His His Gly Val Leu Gly Thr Ser Arg
            915                 920                 925
Pro Gly His Tyr Thr Val Met Tyr Asp Asp Lys Gly Met Ser Gln Asp
    930                 935                 940
Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala Phe Leu Ser Ala Arg Cys
945                 950                 955                 960
Arg Lys Pro Ile Ser Leu Pro Val Pro Val His Tyr Ala His Leu Ser
                965                 970                 975
Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr Tyr Lys Glu His Tyr Ile
            980                 985                 990
Gly Asp Tyr Ala Gln Pro Arg Thr Arg His Glu Met Glu His Phe Leu
            995                 1000                1005
Gln Thr Asn Val Lys Tyr Pro Gly Met Ser Phe Ala
    1010                1015                1020
```

<210> 4
<211> 1222
<212> DNA
<213> Caenorhabditis elegans

<400> 4

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atggatttaa ccaaactaac gtttgaaagc gttttcggtg gatcagatgt tcctatgaag     60
ccttcccgat cggaggataa caaaacgcca agaaacagaa cagatttgga gatgtttctg    120
aagaaaactc ccctcatggt actagaagag gctgctaagg ctgtctatca aaagacgcca    180
acttggggca ctgtcgaact tcctgaaggc ttcgagatga cgttgattct gaatgaaatt    240
actgtaaaag gccagcaac aagcaagaaa gctgcgagac aaaaggctgc tgttgaatat    300
ttacgcaagg ttgtggagaa aggaaagcac gaaatctttt tcattcctgg aacaaccaaa    360
gaagaagctc tttcgaatat tgatcaaata tcggataagg ctgaggaatt gaaacgatca    420
acttcagatg ctgttcagga taacgataac gatgattcga ttcctacaag tgctgaattt    480
ccacctggta tttcgccaac cgagaattgg gtcggaaagt tgcaggaaaa atctcaaaaa    540
agcaagctgc aagcccccaat ctatgaagat tccaagaatg agagaaccga gcgtttcttg    600
gttatatgca cgatgtgcaa tcaaaaaacc agaggaatca gaagtaagaa gaaggacgca    660
aagaatcttg cagcatggtt gatgtggaaa gcgttggaag acggtatcga atctctggaa    720
tcatatgata tggttgatgt gattgaaaat ttggaagaag ctgaacattt actcgaaatt    780
caggatcaag catccaagat taaagacaag cattccgcac tgattgatat actctcggac    840
aagaaaagat tttcagacta cagcatggat ttcaacgtat tatcagtgag cacaatggga    900
atacatcagg tgctattgga aatctcgttc cggcgtctag tttctccaga ccccgacgat    960
ttggaaatgg gagcagaaca cacccagact gaagaaatta tgaaggctac tgccgagaag   1020
gaaaagctac ggaagaagaa tatgccagat tccgggccgc tagtgtttgc tggacatggt   1080
tcatcggcgg aagaggctaa acagtgtgct tgtaaatcgg cgattatcca tttcaacacc   1140
tatgatttca cggattgaaa atattattgc gtattcctga aaaatgaagc gtctgaatga   1200
ttataaaaaa aaaaaaaaaa aa                                            1222
```

<210> 5
<211> 407
<212> PRT
<213> Caenorhabditis elegans

<400> 5

```
Met Asp Leu Thr Lys Leu Thr Phe Glu Ser Val Phe Gly Gly Ser Asp
  1               5                  10                  15
```

9

```
Val Pro Met Lys Pro Ser Arg Ser Glu Asp Asn Lys Thr Pro Arg Asn
            20              25                  30
Arg Thr Asp Leu Glu Met Phe Leu Lys Lys Thr Pro Leu Met Val Leu
            35              40                  45
Glu Glu Ala Ala Lys Ala Val Tyr Gln Lys Thr Pro Thr Trp Gly Thr
    50              55                  60
Val Glu Leu Pro Glu Gly Phe Glu Met Thr Leu Ile Leu Asn Glu Ile
65              70                  75                      80
Thr Val Lys Gly Gln Ala Thr Ser Lys Lys Ala Ala Arg Gln Lys Ala
            85                  90                      95
Ala Val Glu Tyr Leu Arg Lys Val Val Glu Lys Gly Lys His Glu Ile
            100             105                 110
Phe Phe Ile Pro Gly Thr Thr Lys Glu Glu Ala Leu Ser Asn Ile Asp
        115             120                 125
Gln Ile Ser Asp Lys Ala Glu Glu Leu Lys Arg Ser Thr Ser Asp Ala
    130             135                 140
Val Gln Asp Asn Asp Asn Asp Asp Ser Ile Pro Thr Ser Ala Glu Phe
145             150                 155                     160
Pro Pro Gly Ile Ser Pro Thr Glu Asn Trp Val Gly Lys Leu Gln Glu
            165             170                 175
Lys Ser Gln Lys Ser Lys Leu Gln Ala Pro Ile Tyr Glu Asp Ser Lys
            180             185                 190
Asn Glu Arg Thr Glu Arg Phe Leu Val Ile Cys Thr Met Cys Asn Gln
        195             200                 205
Lys Thr Arg Gly Ile Arg Ser Lys Lys Lys Asp Ala Lys Asn Leu Ala
    210             215                 220
Ala Trp Leu Met Trp Lys Ala Leu Glu Asp Gly Ile Glu Ser Leu Glu
225             230                 235                     240
Ser Tyr Asp Met Val Asp Val Ile Glu Asn Leu Glu Glu Ala Glu His
            245             250                 255
Leu Leu Glu Ile Gln Asp Gln Ala Ser Lys Ile Lys Asp Lys His Ser
            260             265                 270
Ala Leu Ile Asp Ile Leu Ser Asp Lys Lys Arg Phe Ser Asp Tyr Ser
            275             280                 285
Met Asp Phe Asn Val Leu Ser Val Ser Thr Met Gly Ile His Gln Val
    290             295                 300
Leu Leu Glu Ile Ser Phe Arg Arg Leu Val Ser Pro Asp Pro Asp Asp
305             310                 315                     320
Leu Glu Met Gly Ala Glu His Thr Gln Thr Glu Glu Ile Met Lys Ala
            325             330                 335
Thr Ala Glu Lys Glu Lys Leu Arg Lys Lys Asn Met Pro Asp Ser Gly
            340             345                 350
Pro Leu Val Phe Ala Gly His Gly Ser Ser Ala Glu Glu Ala Lys Gln
            355             360                 365
Cys Ala Cys Lys Ser Ala Ile Ile His Phe Asn Thr Tyr Asp Phe Thr
    370             375                 380
Asp
```

```
<210> 6
<211> 763
<212> PRT
<213> Arabidopsis thaliana
```

```
<400> 6
Gly Ile Ile Asn Gly Pro Lys Arg Glu Arg Ser Tyr Lys Val Ala Ile
1               5                   10                  15
Lys Phe Val Ala Arg Ala Asn Met His Leu Gly Glu Phe Leu Ala
            20              25                  30
Gly Lys Arg Ala Asp Cys Pro Gln Glu Ala Val Gln Ile Leu Asp Ile
        35              40                  45
```

```
Val Leu Arg Glu Leu Ser Val Lys Arg Phe Cys Pro Val Gly Arg Ser
    50                      55                  60
Phe Phe Ser Pro Asp Ile Lys Thr Pro Gln Arg Leu Gly Glu Gly Leu
65                      70                  75                  80
Glu Ser Trp Cys Gly Phe Tyr Gln Ser Ile Arg Pro Thr Gln Met Gly
                85                  90                  95
Leu Ser Leu Asn Ile Asp Met Ala Ser Ala Ala Phe Ile Glu Pro Leu
            100                 105                 110
Pro Val Ile Glu Phe Val Ala Gln Leu Leu Gly Lys Asp Val Leu Ser
            115                 120                 125
Lys Pro Leu Ser Asp Ser Asp Arg Val Lys Ile Lys Lys Gly Leu Arg
    130                 135                 140
Gly Val Lys Val Glu Val Thr His Arg Ala Asn Val Arg Arg Lys Tyr
145                 150                 155                 160
Arg Val Ala Gly Leu Thr Thr Gln Pro Thr Arg Glu Leu Met Phe Pro
            165                 170                 175
Val Asp Glu Asn Cys Thr Met Lys Ser Val Ile Glu Tyr Phe Gln Glu
            180                 185                 190
Met Tyr Gly Phe Thr Ile Gln His Thr His Leu Pro Cys Leu Gln Val
            195                 200                 205
Gly Asn Gln Lys Lys Ala Ser Tyr Leu Pro Met Glu Ala Cys Lys Ile

    210                 215                 220
Val Glu Gly Gln Arg Tyr Thr Lys Arg Leu Asn Glu Lys Gln Ile Thr
225                 230                 235                 240
Ala Leu Leu Lys Val Thr Cys Gln Arg Ala Glu Gly Gln Arg Asn Asp
            245                 250                 255
Ile Leu Arg Thr Val Gln His Asn Ala Tyr Asp Gln Asp Pro Tyr Ala
            260                 265                 270
Lys Glu Phe Gly Met Asn Ile Ser Glu Lys Leu Ala Ser Val Glu Ala
            275                 280                 285
Arg Ile Leu Pro Ala Pro Trp Leu Lys Tyr His Glu Asn Gly Lys Glu
    290                 295                 300
Lys Asp Cys Leu Pro Gln Val Gly Gln Trp Asn Met Met Asn Lys Lys
305                 310                 315                 320
Met Ile Asn Gly Met Thr Val Ser Arg Trp Ala Cys Val Asn Phe Ser
            325                 330                 335
Arg Ser Val Gln Glu Asn Val Ala Arg Gly Phe Cys Asn Glu Leu Gly
            340                 345                 350
Gln Met Cys Glu Val Ser Gly Met Glu Phe Asn Pro Glu Pro Val Ile
            355                 360                 365
Pro Ile Tyr Ser Ala Arg Pro Asp Gln Val Glu Lys Ala Leu Lys His
    370                 375                 380
Val Tyr His Thr Ser Met Asn Lys Thr Lys Gly Lys Glu Leu Glu Leu
385                 390                 395                 400
Leu Leu Ala Ile Leu Pro Asp Asn Asn Gly Ser Leu Tyr Gly Asp Leu
            405                 410                 415
Lys Arg Ile Cys Glu Thr Glu Leu Gly Leu Ile Ser Gln Cys Cys Leu
            420                 425                 430
Thr Lys His Val Phe Lys Ile Ser Lys Gln Tyr Leu Ala Asp Val Ser
            435                 440                 445
Leu Lys Ile Asn Val Lys Met Gly Gly Arg Asn Thr Val Leu Val Asp
    450                 455                 460
Ala Ile Ser Cys Arg Ile Pro Leu Val Ser Asp Ile Pro Thr Ile Ile
465                 470                 475                 480
Phe Gly Ala Asp Val Thr His Pro Glu Asn Gly Glu Glu Ser Ser Pro
            485                 490                 495
Ser Ile Ala Ala Val Val Ala Ser Gln Asp Trp Pro Glu Val Thr Lys
            500                 505                 510
Tyr Ala Gly Leu Val Cys Ala Gln Ala His Arg Gln Glu Leu Ile Gln
            515                 520                 525
```

```
Asp Leu Tyr Lys Thr Trp Gln Asp Pro Val Arg Gly Thr Val Ser Gly
    530                 535             540
Gly Met Ile Arg Asp Leu Leu Ile Ser Phe Arg Lys Ala Thr Gly Gln
545                 550             555                 560
Lys Pro Leu Arg Ile Ile Phe Tyr Arg Asp Gly Val Ser Glu Gly Gln
                565             570                 575
Phe Tyr Gln Val Leu Leu Tyr Glu Leu Asp Ala Ile Arg Lys Ala Cys
            580             585             590
Ala Ser Leu Glu Pro Asn Tyr Gln Pro Pro Val Thr Phe Ile Val Val
        595             600             605
Gln Lys Arg His His Thr Arg Leu Phe Ala Asn Asn His Arg Asp Lys
    610             615             620
Asn Ser Thr Asp Arg Ser Gly Asn Ile Leu Pro Gly Thr Val Val Asp
625             630             635                 640
Thr Lys Ile Cys His Pro Thr Glu Phe Asp Phe Tyr Leu Cys Ser His
            645             650             655
Ala Gly Ile Gln Gly Thr Ser Arg Pro Ala His Tyr His Val Leu Trp
            660             665             670
Asp Glu Asn Asn Phe Thr Ala Asp Gly Ile Gln Ser Leu Thr Asn Asn
            675             680             685
Leu Cys Tyr Thr Tyr Ala Arg Cys Thr Arg Ser Val Ser Ile Val Pro
    690             695             700
Pro Ala Tyr Tyr Ala His Leu Ala Ala Phe Arg Ala Arg Phe Tyr Leu
705             710             715                 720
Glu Pro Glu Ile Met Gln Asp Asn Gly Ser Pro Gly Lys Lys Asn Thr
            725             730             735
Lys Thr Thr Thr Val Gly Asp Val Gly Val Lys Pro Leu Pro Ala Leu
            740             745             750
Lys Glu Asn Val Lys Arg Val Met Phe Tyr Cys
            755             760
```

```
<210> 7
<211> 678
<212> PRT
<213> Drosophila melanogaster
```

```
<400> 7
Arg Ala Gly Glu Asn Ile Glu Ile Lys Ile Lys Ala Val Gly Ser Val
  1             5             10              15
Gln Ser Thr Asp Ala Glu Gln Phe Gln Val Leu Asn Leu Ile Leu Arg
            20              25              30
Arg Ala Met Glu Gly Leu Asp Leu Lys Leu Val Ser Arg Tyr Tyr Tyr
        35              40              45
Asp Pro Gln Ala Lys Ile Asn Leu Glu Asn Phe Arg Met Gln Leu Trp
    50              55              60
Pro Gly Tyr Gln Thr Ser Ile Arg Gln His Glu Asn Asp Ile Leu Leu
65              70              75              80
Cys Ser Glu Ile Cys His Lys Val Met Arg Thr Glu Thr Leu Tyr Asn
            85              90              95
Ile Leu Ser Asp Ala Ile Arg Asp Ser Asp Tyr Gln Ser Thr Phe
            100             105             110
Lys Arg Ala Val Met Gly Met Val Ile Leu Thr Asp Tyr Asn Asn Lys
    115             120             125
Thr Tyr Arg Ile Asp Asp Val Asp Phe Gln Ser Thr Pro Leu Cys Lys
    130             135             140
Phe Lys Thr Asn Asp Gly Glu Ile Ser Tyr Val Asp Tyr Tyr Lys Lys
145             150             155             160
Arg Tyr Asn Ile Ile Ile Arg Asp Leu Lys Gln Pro Leu Val Met Ser
            165             170             175
Arg Pro Thr Asp Lys Asn Ile Arg Gly Gly Asn Asp Gln Ala Ile Met
            180             185             190
```

12

```
Ile Ile Pro Glu Leu Ala Arg Ala Thr Gly Met Thr Asp Ala Met Arg
        195                     200                 205
Ala Asp Phe Arg Thr Leu Arg Ala Met Ser Glu His Thr Arg Leu Asn
    210                     215                 220
Pro Asp Arg Arg Ile Glu Arg Leu Arg Met Phe Asn Lys Arg Leu Lys
225                     230                 235                 240
Ser Cys Lys Gln Ser Val Glu Thr Leu Lys Ser Trp Asn Ile Glu Leu
            245                 250                     255
Asp Ser Ala Leu Val Glu Ile Pro Ala Arg Val Leu Pro Pro Glu Lys
            260                 265                 270
Ile Leu Phe Gly Asn Gln Lys Ile Phe Val Cys Asp Ala Arg Ala Asp
            275                 280                 285
Trp Thr Asn Glu Phe Arg Thr Cys Ser Met Phe Lys Asn Val His Ile
    290                 295                 300
Asn Arg Trp Tyr Val Ile Thr Pro Ser Arg Asn Leu Arg Glu Thr Gln
305                 310                 315                 320
Glu Phe Val Gln Met Cys Ile Arg Thr Ala Ser Ser Met Lys Met Asn
            325                 330                 335
Ile Cys Asn Pro Ile Tyr Glu Glu Ile Pro Asp Asp Arg Asn Gly Thr
            340                 345                 350
Tyr Ser Gln Ala Ile Asp Asn Ala Ala Ala Asn Asp Pro Gln Ile Val
            355                 360                 365
Met Val Val Met Arg Ser Pro Asn Glu Glu Lys Tyr Ser Cys Ile Lys
    370                 375                 380
Lys Arg Thr Cys Val Asp Arg Pro Val Pro Ser Gln Val Val Thr Leu
385                 390                 395                 400
Lys Val Ile Ala Pro Arg Gln Gln Lys Pro Thr Gly Leu Met Ser Ile
            405                 410                 415
Ala Thr Lys Val Val Ile Gln Met Asn Ala Lys Leu Met Gly Ala Pro
            420                 425                 430
Trp Gln Val Val Ile Pro Leu His Gly Leu Met Thr Val Gly Phe Asp
        435                 440                 445
Val Cys His Ser Pro Lys Asn Lys Asn Lys Ser Tyr Gly Ala Phe Val
    450                 455                 460
Ala Thr Met Asp Gln Lys Glu Ser Phe Arg Tyr Phe Ser Thr Val Asn
465                 470                 475                 480
Glu His Ile Lys Gly Gln Glu Leu Ser Glu Gln Met Ser Val Asn Met
            485                 490                 495
Ala Cys Ala Leu Arg Ser Tyr Gln Glu Gln His Arg Ser Leu Pro Glu
            500                 505                 510
Arg Ile Leu Phe Phe Arg Asp Gly Val Gly Asp Gly Gln Leu Tyr Gln
        515                 520                 525
Val Val Asn Ser Glu Val Asn Thr Leu Lys Asp Arg Leu Asp Glu Ile
    530                 535                 540
Tyr Lys Ser Ala Gly Lys Gln Glu Gly Cys Arg Met Thr Phe Ile Ile
545                 550                 555                 560
Val Ser Lys Arg Ile Asn Ser Arg Tyr Phe Thr Gly His Arg Asn Pro
            565                 570                 575
Val Pro Gly Thr Val Val Asp Asp Val Ile Thr Leu Pro Glu Arg Tyr
            580                 585                 590
Asp Phe Phe Leu Val Ser Gln Ala Val Arg Ile Gly Thr Val Ser Pro
            595                 600                 605
Thr Ser Tyr Asn Val Ile Ser Asp Asn Met Gly Leu Asn Ala Asp Lys
    610                 615                 620
Leu Gln Met Leu Ser Tyr Lys Met Thr His Met Tyr Tyr Asn Tyr Ser
625                 630                 635                 640
Gly Thr Ile Arg Val Pro Ala Val Cys His Tyr Ala His Lys Leu Ala
            645                 650                 655
Phe Leu Val Ala Glu Ser Ile Asn Arg Ala Pro Ser Ala Gly Leu Gln
            660                 665                 670
```

13

```
Asn Gln Leu Tyr Phe Leu
        675


<210> 8
<211> 69
<212> PRT
<213> Artificial Sequence

<220>
<223> Consensus sequence

<221> VARIANT
<222> (1)...(69)
<223> Xaa = Any Amino Acid

<400> 8
Pro Xaa Xaa Xaa Leu Xaa Glu Xaa Xaa Xaa Gln Xaa Xaa Xaa Xaa Xaa
 1               5                   10                  15
Xaa Xaa Xaa Tyr Xaa Xaa Xaa Xaa Xaa Xaa Gly Pro Xaa His Xaa Xaa
            20                  25                  30
Xaa Phe Xaa Xaa Xaa Val Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Xaa Gly
        35                  40                  45
Xaa Gly Xaa Ser Lys Lys Xaa Xaa Ala Lys Xaa Xaa Ala Ala Xaa Xaa
    50                  55                  60
Ala Leu Xaa Xaa Leu
 65


<210> 9
<211> 766
<212> PRT
<213> Caenorhabditis elegans

<400> 9
Ser Ala Val Glu Arg Gln Phe Ser Val Ser Leu Lys Trp Val Gly Gln
 1               5                   10                  15
Val Ser Leu Ser Thr Leu Glu Asp Ala Met Glu Gly Arg Val Arg Gln
            20                  25                  30
Val Pro Phe Glu Ala Val Gln Ala Met Asp Val Ile Leu Arg His Leu
        35                  40                  45
Pro Ser Leu Lys Tyr Thr Pro Val Gly Arg Ser Phe Phe Ser Pro Pro
    50                  55                  60
Val Pro Asn Ala Ser Gly Val Met Ala Gly Ser Cys Pro Pro Gln Ala
 65                  70                  75                  80
Ser Gly Ala Val Ala Gly Gly Ala His Ser Ala Gly Gln Tyr His Ala
                85                  90                  95
Glu Ser Lys Leu Gly Gly Gly Arg Glu Val Trp Phe Gly Phe His Gln
            100                 105                 110
Ser Val Arg Pro Ser Gln Trp Lys Met Met Leu Asn Ile Asp Val Ser
            115                 120                 125
Ala Thr Ala Phe Tyr Arg Ser Met Pro Val Ile Glu Phe Ile Ala Glu
    130                 135                 140
Val Leu Glu Leu Pro Val Gln Ala Leu Ala Glu Arg Arg Ala Leu Ser
145                 150                 155                 160
Asp Ala Gln Arg Val Lys Phe Thr Lys Glu Ile Arg Gly Leu Lys Ile
                165                 170                 175
Glu Ile Thr His Cys Gly Gln Met Arg Arg Lys Tyr Arg Val Cys Asn
            180                 185                 190
Val Thr Arg Arg Pro Ala Gln Thr Gln Thr Phe Pro Leu Gln Leu Glu
    195                 200                 205
Thr Gly Gln Thr Ile Glu Cys Thr Val Ala Lys Tyr Phe Tyr Asp Lys
    210                 215                 220
```

```
Tyr Arg Ile Gln Leu Lys Tyr Pro His Leu Pro Cys Leu Gln Val Gly
225             230             235                 240
Gln Glu Gln Lys His Thr Tyr Leu Pro Pro Glu Val Cys Asn Ile Val
            245             250                 255
Pro Gly Gln Arg Cys Ile Lys Lys Leu Thr Asp Val Gln Thr Ser Thr
            260             265             270
Met Ile Lys Ala Thr Ala Arg Ser Ala Pro Glu Arg Glu Arg Glu Ile
        275             280             285
Ser Asn Leu Val Arg Lys Ala Glu Phe Ser Ala Asp Pro Phe Ala His
    290             295             300
Glu Phe Gly Ile Thr Ile Asn Pro Ala Met Thr Glu Val Lys Gly Arg
305             310             315                 320
Val Leu Ser Ala Pro Lys Leu Leu Tyr Gly Gly Arg Thr Arg Ala Thr
            325             330             335
Ala Leu Pro Asn Gln Gly Val Trp Asp Met Arg Gly Lys Gln Phe His
            340             345             350
Thr Gly Ile Asp Val Arg Val Trp Ala Ile Ala Cys Phe Ala Gln Gln
    355             360             365
Gln His Val Lys Glu Asn Asp Leu Arg Met Phe Thr Asn Gln Leu Gln
    370             375             380
Arg Ile Ser Asn Asp Ala Gly Met Pro Ile Val Gly Asn Pro Cys Phe
385             390             395                 400
Cys Lys Tyr Ala Val Gly Val Glu Gln Val Glu Pro Met Phe Lys Tyr
            405             410             415
Leu Lys Gln Asn Tyr Ser Gly Ile Gln Leu Val Val Val Val Leu Pro
            420             425             430
Gly Lys Thr Pro Val Tyr Ala Glu Val Lys Arg Val Gly Asp Thr Val
            435             440             445
Leu Gly Ile Ala Thr Gln Cys Val Gln Ala Lys Asn Ala Ile Arg Thr
    450             455             460
Thr Pro Gln Thr Leu Ser Asn Leu Cys Leu Lys Met Asn Val Lys Leu
465             470             475                 480
Gly Gly Val Asn Ser Ile Leu Leu Pro Asn Val Arg Pro Arg Ile Phe
            485             490             495
Asn Glu Pro Val Ile Phe Phe Gly Cys Asp Ile Thr His Pro Pro Ala
            500             505             510
Gly Asp Ser Arg Lys Pro Ser Ile Ala Ala Val Val Gly Ser Met Asp
            515             520             525
Ala His Pro Ser Arg Tyr Ala Ala Thr Val Arg Val Gln Gln His Arg
    530             535             540
Gln Glu Ile Ile Ser Asp Leu Thr Tyr Met Val Arg Glu Leu Leu Val
545             550             555                 560
Gln Phe Tyr Arg Asn Thr Arg Phe Lys Pro Ala Arg Ile Val Val Tyr
            565             570             575
Arg Asp Gly Val Ser Glu Gly Gln Phe Phe Asn Val Leu Gln Tyr Glu
            580             585             590
Leu Arg Ala Ile Arg Glu Ala Cys Met Met Leu Glu Arg Gly Tyr Gln
    595             600             605
Pro Gly Ile Thr Phe Ile Ala Val Gln Lys Arg His His Thr Arg Leu
    610             615             620
Phe Ala Val Asp Lys Lys Asp Gln Val Gly Lys Ala Tyr Asn Ile Pro
625             630             635                 640
Pro Gly Thr Thr Val Asp Val Gly Ile Thr His Pro Thr Glu Phe Asp
            645             650             655
Phe Tyr Leu Cys Ser His Ala Gly Ile Gln Gly Thr Ser Arg Pro Ser
            660             665             670
His Tyr His Val Leu Trp Asp Asp Asn Asn Leu Thr Ala Asp Glu Leu
    675             680             685
Gln Gln Leu Thr Tyr Gln Met Cys His Thr Tyr Val Arg Cys Thr Arg
    690             695             700
```

```
Ser Val Ser Ile Pro Ala Pro Ala Tyr Tyr Ala His Leu Val Ala Phe
705             710             715             720
Arg Ala Arg Tyr His Leu Val Asp Arg Glu His Asp Ser Gly Glu Gly
            725             730             735
Ser Gln Pro Ser Gly Thr Ser Glu Asp Thr Thr Leu Ser Asn Met Ala
            740             745             750
Arg Ala Val Gln Val Ile Leu Ala Phe Asn Leu Val Ser Ile
            755             760             765
```

<210> 10
<211> 737
<212> PRT
<213> Oryctolagus cuniculus

<400> 10

```
Gly Lys Asp Arg Ile Phe Lys Val Ser Ile Lys Trp Val Ser Cys Val
  1               5              10              15
Ser Leu Gln Ala Leu His Asp Ala Leu Ser Gly Arg Leu Pro Ser Val
            20              25              30
Pro Phe Glu Thr Ile Gln Ala Leu Asp Val Val Met Arg His Leu Pro
        35              40              45
Ser Met Arg Tyr Thr Pro Val Gly Arg Ser Phe Phe Thr Ala Ser Glu
    50              55              60
Gly Cys Ser Asn Pro Leu Gly Gly Gly Arg Glu Val Trp Phe Gly Phe
 65             70              75              80
His Gln Ser Val Arg Pro Ser Leu Trp Lys Met Met Leu Asn Ile Asp
            85              90              95
Val Ser Ala Thr Ala Phe Tyr Lys Ala Gln Pro Val Ile Glu Phe Val
        100             105             110
Cys Glu Val Leu Asp Phe Lys Ser Ile Glu Glu Gln Gln Lys Pro Leu
        115             120             125
Thr Asp Ser Gln Arg Val Lys Phe Thr Lys Glu Ile Lys Gly Leu Lys
    130             135             140
Val Glu Ile Thr His Cys Gly Gln Met Lys Arg Lys Tyr Arg Val Cys
145             150             155             160
Asn Val Thr Arg Arg Pro Ala Ser His Gln Thr Phe Pro Leu Gln Gln
            165             170             175
Glu Ser Gly Gln Thr Val Glu Cys Thr Val Ala Gln Tyr Phe Lys Asp
            180             185             190
Arg His Lys Leu Val Leu Arg Tyr Pro His Leu Pro Cys Leu Gln Val
        195             200             205
Gly Gln Glu Gln Lys His Thr Tyr Leu Pro Leu Glu Val Cys Asn Ile
    210             215             220
Val Ala Gly Gln Arg Cys Ile Lys Lys Leu Thr Asp Asn Gln Thr Ser
225             230             235             240
Thr Met Ile Arg Ala Thr Ala Arg Ser Ala Pro Asp Arg Gln Glu Glu
            245             250             255
Ile Ser Lys Leu Met Arg Ser Ala Ser Phe Asn Thr Asp Pro Tyr Val
            260             265             270
Arg Glu Phe Gly Ile Met Val Lys Asp Glu Met Thr Asp Val Thr Gly
        275             280             285
Arg Val Leu Gln Pro Pro Ser Ile Leu Tyr Gly Gly Arg Asn Lys Ala
    290             295             300
Ile Ala Thr Pro Val Gln Gly Val Trp Asp Met Arg Asn Lys Gln Phe
305             310             315             320
His Thr Gly Ile Glu Ile Lys Val Trp Ala Ile Ala Cys Phe Ala Pro
            325             330             335
Gln Arg Gln Cys Thr Glu Val His Leu Lys Ser Phe Thr Glu Gln Leu
        340             345             350
Arg Lys Ile Ser Arg Asp Ala Gly Met Pro Ile Gln Gly Gln Pro Cys
        355             360             365
```

16

```
Phe Cys Lys Tyr Ala Gln Gly Ala Asp Ser Val Gly Pro Met Phe Arg
    370                 375                 380
His Leu Lys Asn Thr Tyr Ala Gly Leu Gln Leu Val Val Val Ile Leu
385                 390                 395                 400
Pro Gly Lys Thr Pro Val Tyr Ala Glu Val Lys Arg Val Gly Asp Thr
                405                 410                 415
Val Leu Gly Met Ala Thr Gln Cys Val Gln Met Lys Asn Val Gln Arg
            420                 425                 430
Thr Thr Pro Gln Thr Leu Ser Asn Leu Cys Leu Lys Ile Asn Val Lys
        435                 440                 445
Leu Gly Gly Val Asn Asn Ile Leu Leu Pro Gln Gly Arg Pro Pro Val
    450                 455                 460
Phe Gln Gln Pro Val Ile Phe Leu Gly Ala Asp Val Thr His Pro Pro
465                 470                 475                 480
Ala Gly Asp Gly Lys Lys Pro Ser Ile Ala Ala Val Val Gly Ser Met
                485                 490                 495
Asp Ala His Pro Asn Arg Tyr Cys Ala Thr Val Arg Val Gln Gln His
            500                 505                 510
Arg Gln Glu Ile Ile Gln Asp Leu Ala Ala Met Val Arg Glu Leu Leu
        515                 520                 525
Ile Gln Phe Tyr Lys Ser Thr Arg Phe Lys Pro Thr Arg Ile Ile Phe
    530                 535                 540
Tyr Arg Asp Gly Val Ser Glu Gly Gln Phe Gln Gln Val Leu His His
545                 550                 555                 560
Glu Leu Leu Ala Ile Arg Glu Ala Cys Ile Lys Leu Glu Lys Asp Tyr
                565                 570                 575
Gln Pro Gly Ile Thr Phe Ile Val Val Gln Lys Arg His His Thr Arg
            580                 585                 590
Leu Phe Cys Thr Asp Lys Asn Glu Arg Val Gly Lys Ser Gly Asn Ile
        595                 600                 605
Pro Ala Gly Thr Thr Val Asp Thr Lys Ile Thr His Pro Thr Glu Phe
    610                 615                 620
Asp Phe Tyr Leu Cys Ser His Ala Gly Ile Gln Gly Thr Ser Arg Pro
625                 630                 635                 640
Ser His Tyr His Val Leu Trp Asp Asp Asn Arg Phe Ser Ser Asp Glu
                645                 650                 655
Leu Gln Ile Leu Thr Tyr Gln Leu Cys His Thr Tyr Val Arg Cys Thr
            660                 665                 670
Arg Ser Val Ser Ile Pro Ala Pro Ala Tyr Tyr Ala His Leu Val Ala
        675                 680                 685
Phe Arg Ala Arg Tyr His Leu Val Asp Lys Glu His Asp Ser Ala Glu
    690                 695                 700
Gly Ser His Thr Ser Gly Gln Ser Asn Gly Arg Asp His Gln Ala Leu
705                 710                 715                 720
Ala Lys Ala Val Gln Val His Gln Asp Thr Leu Arg Thr Met Tyr Phe
                725                 730                 735
Ala
```

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<210> 11
<211> 66
<212> PRT
<213> Xenopus laevis

<400> 11
Pro Val Gly Ser Leu Gln Glu Leu Ala Val Gln Lys Gly Trp Arg Leu
  1               5                  10                  15
Pro Glu Tyr Thr Val Ala Gln Glu Ser Gly Pro Pro His Lys Arg Glu
                20                  25                  30
Phe Thr Ile Thr Cys Arg Val Glu Thr Phe Val Glu Thr Gly Ser Gly
            35                  40                  45
```

```
Thr Ser Lys Gln Val Ala Lys Arg Val Ala Ala Glu Lys Leu Leu Thr
    50                  55                  60
Lys Phe
 65



<210> 12
<211> 66
<212> PRT
<213> Homo sapiens

<400> 12
Phe Met Glu Glu Leu Asn Thr Tyr Arg Gln Lys Gln Gly Val Val Leu
 1               5                  10                  15
Lys Tyr Gln Glu Leu Pro Asn Ser Gly Pro Pro His Asp Arg Arg Phe
            20                  25                  30
Thr Phe Gln Val Ile Ile Asp Gly Arg Glu Phe Pro Glu Gly Glu Gly
        35                  40                  45
Arg Ser Lys Lys Glu Ala Lys Asn Ala Ala Ala Lys Leu Ala Val Glu
    50                  55                  60
Ile Leu
 65



<210> 13
<211> 818
<212> PRT
<213> Caenorhabditis elegans

<400> 13
Val Asn Glu Glu Ile Lys Val Gln Phe Ala Lys Asn Phe Val Tyr Asp
 1               5                  10                  15
Asn Asn Ser Ile Leu Arg Val Pro Glu Ser Phe His Asp Pro Asn Arg
            20                  25                  30
Phe Glu Gln Ser Leu Glu Val Ala Pro Arg Ile Glu Ala Trp Phe Gly
        35                  40                  45
Ile Tyr Ile Gly Ile Lys Glu Leu Phe Asp Gly Glu Pro Val Leu Asn
    50                  55                  60
Phe Ala Ile Val Asp Lys Leu Phe Tyr Asn Ala Pro Lys Met Ser Leu
 65                  70                  75                  80
Leu Asp Tyr Leu Leu Leu Ile Val Asp Pro Gln Ser Cys Asn Asp Asp
                85                  90                  95
Val Arg Lys Asp Leu Lys Thr Lys Leu Met Ala Gly Lys Met Thr Ile
            100                 105                 110
Arg Gln Ala Ala Arg Pro Arg Ile Arg Gln Leu Leu Glu Asn Leu Lys
            115                 120                 125
Leu Lys Cys Ala Glu Val Trp Asp Asn Glu Met Ser Arg Leu Thr Glu
    130                 135                 140
Arg His Leu Thr Phe Leu Asp Leu Cys Glu Glu Asn Ser Leu Val Tyr
145                 150                 155                 160
Lys Val Thr Gly Lys Ser Asp Arg Gly Arg Asn Ala Lys Lys Tyr Asp
                165                 170                 175
Thr Thr Leu Phe Lys Ile Tyr Glu Glu Asn Lys Lys Phe Ile Glu Phe
            180                 185                 190
Pro His Leu Pro Leu Val Lys Val Lys Ser Gly Ala Lys Glu Tyr Ala
            195                 200                 205
Val Pro Met Glu His Leu Glu Val His Glu Lys Pro Gln Arg Tyr Lys
    210                 215                 220
Asn Arg Ile Asp Leu Val Met Gln Asp Lys Phe Leu Lys Arg Ala Thr
225                 230                 235                 240
Arg Lys Pro His Asp Tyr Lys Glu Asn Thr Leu Lys Met Leu Lys Glu
                245                 250                 255
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18

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Leu Asp Phe Ser Ser Glu Glu Leu Asn Phe Val Glu Arg Phe Gly Leu
            260                 265                 270
Cys Ser Lys Leu Gln Met Ile Glu Cys Pro Gly Lys Val Leu Lys Glu
        275                 280                 285
Pro Met Leu Val Asn Ser Val Asn Glu Gln Ile Lys Met Thr Pro Val
        290                 295                 300
Ile Arg Gly Phe Gln Glu Lys Gln Leu Asn Val Val Pro Glu Lys Glu
305                 310                 315                 320
Leu Cys Cys Ala Val Phe Val Val Asn Glu Thr Ala Gly Asn Pro Cys
            325                 330                 335
Leu Glu Glu Asn Asp Val Val Lys Phe Tyr Thr Glu Leu Ile Gly Gly
            340                 345                 350
Cys Lys Phe Arg Gly Ile Arg Ile Gly Ala Asn Glu Asn Arg Gly Ala
        355                 360                 365
Gln Ser Ile Met Tyr Asp Ala Thr Lys Asn Glu Tyr Ala Phe Tyr Lys
    370                 375                 380
Asn Cys Thr Leu Asn Thr Gly Ile Gly Arg Phe Glu Ile Ala Ala Thr
385                 390                 395                 400
Glu Ala Lys Asn Met Phe Glu Arg Leu Pro Asp Lys Glu Gln Lys Val
            405                 410                 415
Leu Met Phe Ile Ile Ile Ser Lys Arg Gln Leu Asn Ala Tyr Gly Phe
            420                 425                 430
Val Lys His Tyr Cys Asp His Thr Ile Gly Val Ala Asn Gln His Ile
        435                 440                 445
Thr Ser Glu Thr Val Thr Lys Ala Leu Ala Ser Leu Arg His Glu Lys
    450                 455                 460
Gly Ser Lys Arg Ile Phe Tyr Gln Ile Ala Leu Lys Ile Asn Ala Lys
465                 470                 475                 480
Leu Gly Gly Ile Asn Gln Glu Leu Asp Trp Ser Glu Ile Ala Glu Ile
            485                 490                 495
Ser Pro Glu Glu Lys Glu Arg Arg Lys Thr Met Pro Leu Thr Met Tyr
        500                 505                 510
Val Gly Ile Asp Val Thr His Pro Thr Ser Tyr Ser Gly Ile Asp Tyr
        515                 520                 525
Ser Ile Ala Ala Val Val Ala Ser Ile Asn Pro Gly Gly Thr Ile Tyr
    530                 535                 540
Arg Asn Met Ile Val Thr Gln Glu Glu Cys Arg Pro Gly Glu Arg Ala
545                 550                 555                 560
Val Ala His Gly Arg Glu Arg Thr Asp Ile Leu Glu Ala Lys Phe Val
            565                 570                 575
Lys Leu Leu Arg Glu Phe Ala Glu Asn Asn Asp Asn Arg Ala Pro Ala
        580                 585                 590
His Ile Val Val Tyr Arg Asp Gly Val Ser Asp Ser Glu Met Leu Arg
        595                 600                 605
Val Ser His Asp Glu Leu Arg Ser Leu Lys Ser Glu Val Lys Gln Phe
    610                 615                 620
Met Ser Glu Arg Asp Gly Glu Asp Pro Glu Pro Lys Tyr Thr Phe Ile
625                 630                 635                 640
Val Ile Gln Lys Arg His Asn Thr Arg Leu Leu Arg Arg Met Glu Lys
            645                 650                 655
Asp Lys Pro Val Val Asn Lys Asp Leu Thr Pro Ala Glu Thr Asp Val
        660                 665                 670
Ala Val Ala Ala Val Lys Gln Trp Glu Glu Asp Met Lys Glu Ser Lys
        675                 680                 685
Glu Thr Gly Ile Val Asn Pro Ser Ser Gly Thr Thr Val Asp Lys Leu
    690                 695                 700
Ile Val Ser Lys Tyr Lys Phe Asp Phe Phe Leu Ala Ser His His Gly
705                 710                 715                 720
Val Leu Gly Thr Ser Arg Pro Gly His Tyr Thr Val Met Tyr Asp Asp
            725                 730                 735
```

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Lys Gly Met Ser Gln Asp Glu Val Tyr Lys Met Thr Tyr Gly Leu Ala
            740                 745                 750
Phe Leu Ser Ala Arg Cys Arg Lys Pro Ile Ser Leu Pro Val Pro Val
            755                 760                 765
His Tyr Ala His Leu Ser Cys Glu Lys Ala Lys Glu Leu Tyr Arg Thr
            770                 775                 780
Tyr Lys Glu His Tyr Ile Gly Asp Tyr Ala Gln Pro Arg Thr Arg His
785                 790                 795                 800
Glu Met Glu His Phe Leu Gln Thr Asn Val Lys Tyr Pro Gly Met Ser
                805                 810                 815
Phe Ala


<210> 14
<211> 63
<212> PRT
<213> Caenorhabditis elegans

<400> 14
Trp Val Gly Lys Leu Gln Phe Lys Ser Gln Lys Ser Lys Leu Gln Ala
 1               5                  10                  15
Asp Ile Tyr Glu Asp Ser Lys Asn Glu Arg Thr Glu Phe Thr Leu Val
            20                  25                  30
Ile Cys Thr Met Cys Asn Gln Lys Thr Arg Gly Ile Thr Ser Lys Gln
            35                  40                  45
Lys Asp Ala Lys Asn Leu Ala Ala Trp Leu Met Trp Lys Ala Leu
        50                  55                  60
```